

KYOCERA R-651

A M / F M S T E R E O T U N E R / A M P L I F I E R
WITH MOS FET HIGH-SPEED POWER AMPS



MASTERING THE ART OF SOUND

THE KYOCERA R-651 WITH MOS FET SOUND ENGINEERING

Design of a superlative audio component such as the R-651 requires careful consideration both of the machine and those who will be using it. Good engineering plus good sound. To those ends, Kyocera engineers have combined advanced technology with exceptional operating features to provide superb performance and optimum enjoyment.

A quartz lock on tuning accuracy.

The first requirements for enjoying the true quality of FM stereo are pinpoint station tuning and accurately locking in the desired frequency. Kyocera's quartz phase locked loop tuning system provides both tuning accuracy and freedom from drift. A phase comparing frequency at 25 kHz, beyond the bounds of audibility, provides the standard. Should the tuned frequency begin to drift, it is immediately sensed and automatically corrected by the built-in servo circuit. These changes and corrections are imperceptible to the listener.

A switch for better bandwidth.

IF Bandwidth Selectivity, or the tuner's ability to pick out a desired station, may be affected by adjacent stations on the band which transmit a stronger signal than the selected station. Should this occur, the IF bandwidth can be switched from its normal mode to narrow to effectively lock out the unwanted station or interference.

Holding the noise way down.

While the specially designed quartz synthesizer greatly reduces spurious response and improves signal-to-noise

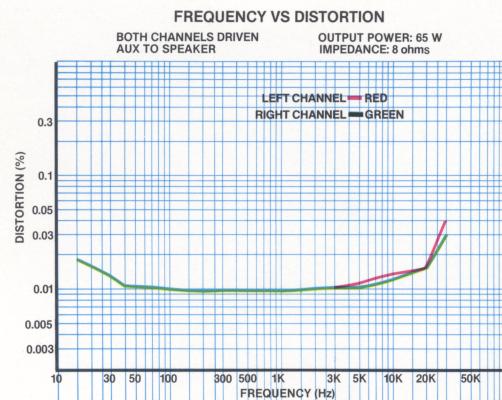
ratios, other areas of noise and distortion must also be controlled. The fluorescent digital frequency display, for example, is driven by a fixed voltage supply. It has been found that displays driven by dynamic switching type voltage often generate switching noise, degrading S/N and distortion ratios. Using a non-switching supply eliminates this problem.

A great tuner up front, too.

At the front end, double-tuned stages are incorporated with automatic gain controlled dual gate MOS FET's in the RF and mixer stages. Tracking of all tuning circuits is accomplished by the use of series twin type variable capacitance diodes for high level signal operation to improve spurious response, image and RF intermodulation rejection. High selectivity linearphase filters smooth out IF response, resulting in overall excellence in sonic quality and selectivity.

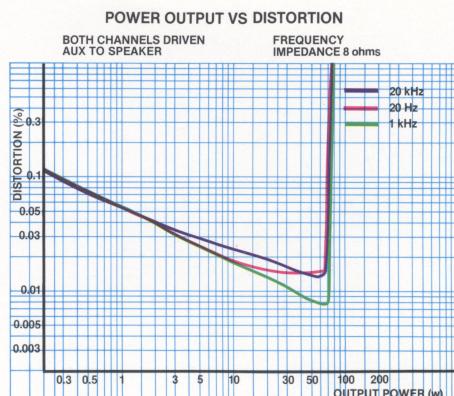
The amplifier alone sets it apart.

Noise and distortion in the amplifier section are held to absolute minimums by Kyocera's use of quality components, such as high-speed power MOS FET's. MOS FET's are the new breed of output transistors that can handle the transients, the power surges, the power requirements of present-day sound (and tomorrow's digital sound) better than bipolar transistors ever could. Used in a complementary configuration, these units deliver high-speed, low-distortion amplification. The amplifier features improved open loop characteristics that use little negative feedback—this results in low transient intermodulation (TIM). The key to this accomplishment is Kyocera's use of MOS FET symmetrical push-pull and 2-pole phase compensation circuits.



Up with switching speed, down with distortion.

Normally, as power transistors switch on and off during operation, they produce a form of noise known as switching distortion. To greatly reduce switching distortion, Kyocera has incorporated an automatic variable bias circuit into the R-651 where incoming signals are constantly monitored and appropriate bias is applied to the MOS FET output transistors. Since the power MOS FET's do not have carrier compensation effect, switching speed is extremely fast, and switching distortion is reduced. These two factors result in low distortion, high speed frequency response and extra wide power bandwidth.



CERA R-651 T POWER AMPS. G FOR GREAT SOUND.



Still more control of noise and distortion.

The R-651 is a direct coupled design in the power amplifier stages. Phase distortion normally caused by coupling capacitors is virtually eliminated—so clean, crisp sound reproduction is assured. Another source of distortion produced by power stage protective circuits has been solved by our R-651's proprietary frequency and pulse duration sensing protection. The safe operating area is expanded automatically while speaker systems and power transistors have complete protection.

Tone equalization for even better listening.

The quest for flat response is often found to be less than satisfactory because of the listening environment. Speaker positioning, furnishings, type of construction—all play a role in the perceived sound. The R-651's bass and treble controls allow continuously variable turnover frequencies to compensate for these various environmental differences. The bass control range is from 100 to 500 Hz variable, while treble ranges from 2 kHz to 10 kHz variable. A subsonic filter of 12 dB/octave vastly reduces turntable rumble without affecting the audible tonal quality, while the high pass filter

minimizes noise from scratched records and noisy mono FM stations, and the FM MPX filter reduces noise on weaker stereo FM stations.

Designed for every audio need.

Against the R-651's sleek, contemporary design in gunmetal brushed aluminum, a striking black screen displays the various modes and functions, including digital frequency display, peak power level, signal strength and a host of other features. All of the operating controls are hidden behind a flip-down front panel, which contributes to the R-651's clean appearance and also protects your settings from accidental changes. Behind the panel, however, is a full array of convenient and versatile functions. One of the benefits of quartz locked tuning is the facility for pre-programming stations. The R-651 provides 14 settings in all, 7 for FM and 7 for AM. In addition, light-touch pushbutton switches enable you to easily seek stations, either automatically or manually. Other switches control instant mute, 2-way tape monitoring inputs, 2-way copying and input selection modes.

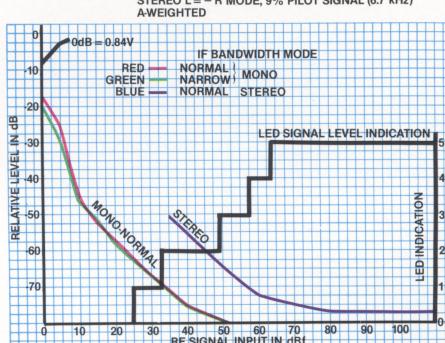
The specs behind the great sound.

The engineering excellence of the R-651 leads to some superlative specifications:

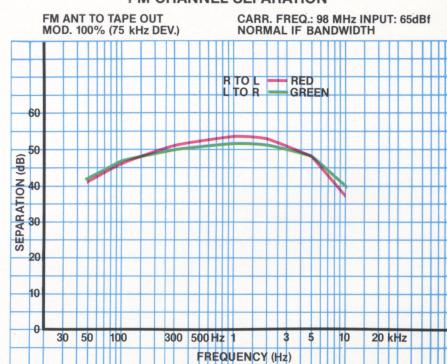
The R-651 delivers 65 watts per channel, continuous RMS into 8 ohms, both channels driven from 20-20,000 Hz with no more than 0.015% total harmonic distortion. The tonal quality of the MOS FET power amp is further enhanced by a slew rate of 60V/μsec and rise time of 1.0 μsec which greatly reduces the transient intermodulation distortion.

S/N, A-weighted ratios, are 82 dB on phono; 100 dB on other inputs. The FM section boasts a usable sensitivity of 10.1 dBf, A-weighted S/N 84 dB mono; 76 dB stereo with separation at 1 kHz of 55 dB.

FM INPUT LEVELS, S+N/N RATIO & SIGNAL LEVEL INDICATION



FM CHANNEL SEPARATION



The complete specification story.

Front panel features

Slide volume control.
Rotary balance, bass, treble and parametric-type equalizer controls.
Input selector—Phono-FM-AM-AUX push type.
Push switches: Tape-1, Tape-2, Tape Copy, Copy/1 to 2, Copy/2 to 1, Audio mute, Mode, Loudness, High blend, IF band-normal/narrow, FM mute-Hi/Lo, High filter, Subsonic filter, Tone EQ, Fluorescent display, Tuning-auto/manual, Tuning-up/down, Seek stop, Memory program 14 station preset, Speakers A, Speakers B and Power-on/off.
Headphone jack (6 m/m dia.).
Input selector and Tape-1, Tape-2 indicators.
LED peak power display (left and right channels).
5 signal strength level LED indicators.
Station lock LED indicator.
Stereo LED indicator.
Auto tuning LED indicator.

Electrical specifications

1] Audio section

Power output RMS, both channels driven into 8 Ohms with no more than 0.015% THD from 20-20,000 Hz	: 65 watts per channel
Total harmonic distortion (at rated output)	: 0.015%.
Intermodulation distortion (at rated output)	: 0.015%.
Power bandwidth (-3 dB rated power)	: 5 Hz-60
Slew rate	: 60 V/ μ sec.
Rise time	: 1.0 μ sec.
Input sensitivity (at rated output)	: 2.5 mV/4
-Phono	: 100 pF.
-Others	: 150mV/3
Maximum input voltage (at 1kHz 0.5% THD)-Phono	: 150 mV.

Hum and noise ratio (IHF, short circuited, A-weighted at rated output)	: 82 dB.
-Phono	: 100 dB.
-Others	
Damping factor (8 Ohm, 1 kHz)	: 50.
Parametric-type equalizer	
Bass (at 500 Hz turnover)	: \pm 10 dB at 100 Hz.
Treble (at 2 kHz turnover)	: \pm 10 dB at 10 kHz.
Turnover control	
Bass control	: 100 to 500 Hz variable.
Treble control	: 2 kHz to 10 kHz variable.
Audio mute	: - 20 dB.
Subsonic filter (12 dB/oct.)	: - 3 dB (20 Hz).
High filter (6 dB/oct.)	: - 6 dB (10 kHz).

21 FM section

Tuning range	: 87.5 to 108 MHz.
Usable sensitivity	
Mono	: 10.1 dBf/1.75 uv.
50 dB quieting sensitivity	
Mono	: 15.5 dBf/3.2 uv.
Stereo	: 36.5 dBf/36.6 uv.
Capture ratio	: 1.0 dB.
Distortion	
Mono (1 kHz)	: 0.07%.
Stereo (1 kHz)	: 0.1%.
Separation	
(1 kHz)	: 55 dB.
Frequency response	
30 to 15,000 Hz	: + / - 0.5 dB.
Signal-to-noise ratio	
(A-weighted)-Mono	: 84 dB.
-Stereo	: 76 dB.
Stereo threshold	: 20 dBf or 40 dBf.
Muting threshold-High	: 40 dBf/55 uv.
-Low	: 20 dBf/5.5 uv.

3] AM section

Tuning range	: 520 to 1710 kHz.
Sensitivity, ferrite antenna (-20 dB S/N)	: 300 microvolt/m.
Image rejection	: 50 dB.
Signal-to-noise ratio	: 50 dB.
IF rejection	: 85 dB.
Selectivity (± 20 kHz)	: 45 dB.
Distortion	: 0.3%.
Recording output voltage	: 0.3 V.
Antenna provisions	: a-Adjustable ferrite. b-External terminal.

Digital control section

Frequency spacing : 10 kHz.
 AM : 100 kHz.
 FM

General specifications

Power requirement : AC 120 V 60 Hz.
 Power consumption : 170 Watts.
 Dimensions:
 Width : 460 mm (18 1/8").
 Height : 132 mm (5 3/16").
 Depth : 369 mm (14 3/16").
 Net weight : 24.9 lbs. (11.3 kgs.).



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